Southern Forest Health
Research and Management Update

Spring 2017

IN THIS ISSUE

This newsletter is a joint publication of:

USDA Forest Service
Southern Research Station
RWU 4552: Insects, Diseases and Invasive Plants of Southern Forests
Contact: Bud Mayfield
828-257-4358
amayfield02@fs.fed.us

AND

USDA Forest Service
Forest Health Protection, Southern Region
Contact: Don Duerr
404-347-3541
dduerr@fs.fed.us

Science and Program Highlights

Screening chestnuts for resistance to Phytophthora and blight

The American Chestnut Foundation (TACF) is beginning its second year of collaboration with the US Forest Service Resistance Screening Center (RSC) in Asheville, NC to screen chestnut seedlings for resistance to Phytophthora root rot disease (causal agent *Phytophthora cinnamomi*). TACF is also expanding its collaboration this year to include small stem assays for chestnut blight (causal agent *Cryphonectria parasitica*) at the RSC. Over 4600 plants will be tested between the two treatments in 2017.

K. O. Summerville, American Chestnut Foundation volunteer, tops off each newly planted chestnut seed with a layer of sand before the trays are moved to the greenhouse. Photo courtesy of TACF.

As part of the collaboration between TACF and the RSC, TACF provided volunteers to assist with planting seed and randomizing seedlings. Volunteers on the project included local residents, students from UNC-Asheville and UNC Wilmington, the chapter president from Charlotte and the retired TACF geneticist. Volunteers will also help with pathogen inoculations in May and disease assessments through the summer and fall.

This collaborative project accelerates TACF's capacity to screen and evaluate chestnut seedlings and provides a unique opportunity to engage the Asheville community in TACF and the USFS's joint efforts to restore the American chestnut and promote the species' comeback in the heart of its range. For more information contact **Sunny Lucas** at slucas02@fs.fed.us.

Assessing the habitat requirements of a forest beetle of potential conservation concern

Little is known about the diversity, ecology or conservation status of saproxylic insects (insects that utilize dead and decaying wood) in North American forests, despite well-documented declines of many related species in Europe. Whereas the European giant stag beetle, *Lucanus cervus*, is highly imperiled and the subject of intense study, for example, we know almost nothing about that species' North American counterpart, *Lucanus elaphus*. With collaborators from the University of Mississippi (Ryan Garrick,

(continued on page 2)

*Stag beetles (*Lucanus elaphus*) and other insects that utilize dead wood contribute greatly to forest biodiversity and are of conservation concern.*

Louis Zachos), Wright State University (John Stireman) and the University of Georgia (Tom Sheehan), we recently published a paper on the ecology, genetics and distribution of *L. elaphus* in the Eastern United States (Insect Conservation and Diversity, in press). Ecological Niche Models based on precise occurrence records indicate that environmental conditions are suitable for the species across much of the southeastern United States but that lowland forests may be preferred. In addition, *L. elaphus* larvae were recovered from a wide range of hardwood log sizes and rot types in bottomland forests, suggesting that a variety of decomposing woody substrates provide suitable breeding habitat for the species. Although the conservation status of *L. elaphus* remains unknown, this study provides some much-needed information about the habitat requirements of the species. For more information, contact **Michael Ulyshen** (mulyshen@fs.fed.us).

2016 Highlights from the Forest Health Monitoring program

In 2016, sustained drought and above average temperatures across a large portion of the South were the driving force behind several major disturbances, including wildfire and unprecedented *Ips* bark beetle activity that materialized during the fall. Drought conditions were most severe in the Southern Appalachians and adjacent parts of the Cumberland Plateau and Piedmont. Based on reporting from state cooperators and FHP staff, the FHM program documented 44,000 acres with tree mortality - mostly due to fires, *Ips* bark beetles, southern pine beetle and drought, and 770,000 acres with defoliation - mostly due to forest tent caterpillar and gypsy moth. In addition, multiple tornadoes and Hurricane Matthew caused varying degrees of damage over an area encompassing 2.2 million acres, most of which was concentrated in southern GA. *Ips* bark beetle activity was unusually severe in northern GA and AL, where spots measuring up to 50 acres in size were reported. Although 15,000 acres of *Ips*-related mortality was documented, this represents just a portion of what is out there since most trees began turning brown during the winter after the 2016 reporting period had ended. For more information, please contact **Chris Asaro** (casaro@fs.fed.us).

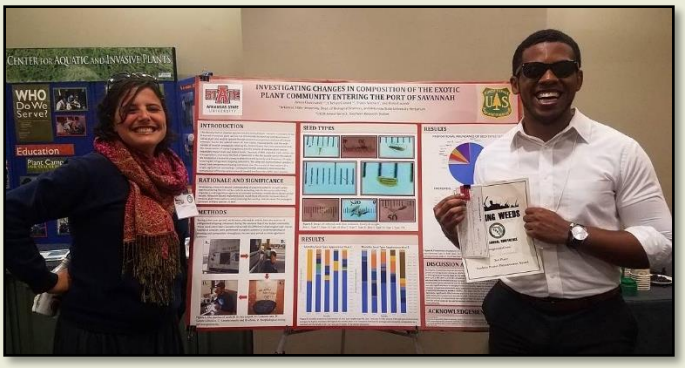
Ips bark beetle gallery on loblolly pine.

Port project on interception of invasive weeds receives presentation honors

Investigative field research examining the introduction of invasive plant propagules into the Port of Savannah was completed at the end of February 2017. This research, in cooperation with US Customs and Border Protection (Dept. of Homeland Security), USDA-APHIS, PPQ, the Georgia Forestry Commission, and Arkansas State and Columbus State Universities, was presented at the annual Florida Exotic Pest Plant Council Meeting, held in Melbourne, FL. Thus far, over 30,000 seeds, putatively from South and Central America, have been sorted and counted. Of those, we have morphologically identified at least one Federal Noxious Weed species, and DNA barcoding has preliminarily identified another. **Dr. Chelsea Cunard**, the Post-Doctoral Research Associate on this project, provided a presentation on the current data analyses and floristic surveys associated with the entire scope of this cooperative research. Jarron Gravesande, the Undergraduate Research Assistant, presented one of few undergraduate posters at this well-attended

continued on page 3

meeting, titled “Investigating changes in composition of the exotic plant community entering the Port of Savannah.” **Jarron won 3rd place** among the student entrants, along with a $50 prize. Please join the Lucardi Lab and collaborators at Arkansas State in congratulating Jarron! For more information, contact **Rima Lucardi** at rlucardi@fs.fed.us.



Dr. Chelsea Cunard (left) and Jarron Gravesande (right) celebrate his win in the student poster contest

Study optimizing trap placement for woodborer detection receives presentation honors

UGA master’s student Tom Sheehan at one of his field sites evaluating wood borer trap placement

Trap placement is an important consideration when designing detection strategies for woodboring insects, but few general guidelines have been developed. A recent analysis from the southeastern United States suggests that the number of bark- and wood-feeding beetles detected by flight intercept traps increases with increasing trap height in the forest interior (Ulyshen and Sheehan, in review). Ambrosia beetles generally exhibit the opposite pattern, however, being more concentrated near the forest floor. Although these findings suggest detection strategies should aim to sample at multiple heights, the situation at the forest edge, where environmental conditions are more consistent from the canopy to the ground, may be different. In an ongoing collaboration between SRS and UGA entomology, we are investigating these questions by trapping at three heights at both forest edge and interior locations. Master’s student **Tom Sheehan** recently presented preliminary results from this study at the 2017 Georgia Entomological Society meeting in a talk for which he was awarded the **T.L. Bissell Award** for the best oral presentation by a M.S./B.S. student. Congratulations Tom! For more information, contact **Mike Ulyshen** at mulyshen@fs.fed.us.

Silver flies represent new potential for hemlock woolly adelgid control in the eastern U.S.

Western U.S. populations of two species of silver flies (*Leucopis* spp.) have been approved for release in the eastern U.S. to help combat the hemlock woolly adelgid (HWA), a devastating pest of eastern and Carolina hemlocks. A recent study with collaborators from the University of Vermont (UVM), Oregon State University, Cornell University and the US Forest Service (NRS and SRS) demonstrated that silver flies from the Pacific Northwest are capable of feeding and developing to the adult stage on HWA in Tennessee and New York. These flies, which are active in the spring, represent a much-needed compliment to *Laricobius* beetle predators that are active in the winter. The paper, lead - authored by UVM master’s student **Kyle Motley**, is in press in the Bulletin of Entomological Research. For more information, contact **Bud Mayfield** at amayfield02@fs.fed.us.

A predatory silver fly on hemlock infested with woolly adelgids

In the News

Scott and Kelly Horn receive "Open Arms Award" from the University of Georgia

SRS 4552 entomologist **Scott Horn** and his wife Kelly Horn received the Mary Ann Kelly Open Arms Award, which honors one or more people in the University of Georgia (UGA) community who have gone above and beyond their formal duties in facilitating the presence of international students and/or scholars at UGA. The Horns provided physical and emotional assistance for Yanzhuo Zhang, an international UGA faculty member, after she was severely injured in a traffic accident while performing field work.

Scott and Kelly Horn with Yanzhuo Zhang and her husband with the Mary Ann Kelly Award

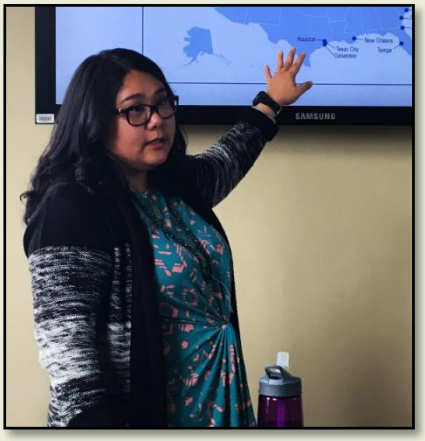
Zhang's husband was out of the country when the accident occurred and the Horns provided the airline ticket that brought him to Athens to help care for Zhang while she was in the hospital. Kelly Horn took leave from work to help Zhang understand the medical procedures and paperwork related to her injuries, and the Horns provided Zhang's family with a hotel room close to the hospital. The Horns also rallied the UGA community to assist Zhang's family with their medical expenses, with Zhang's story appearing in several local media outlets. Scott and Kelly received the award April 4, 2017 at a ceremony in the Georgia Center Magnolia Ballroom.

Forest Service emeritus scientist Jim Miller donates herbarium to Auburn University

Jim Miller with one of the herbarium plant specimens (above) and with Curtis Hansen, curator of the Auburn University Museum of Natural History (right).

The herbarium collection of the George W. Andrews Forestry Sciences Laboratory (USFS) was recently donated to the Auburn University Museum of Natural History (AUMNH). An herbarium is a collection of pressed and dried plants that are used in all aspects of plant research from biogeography to genetics. Approximately 3,000 herbarium sheets representing over five decades of work were donated to ensure the long term care and curation of these specimens. The donation, arranged by Dr. James Miller, emeritus SRS Research Ecologist, in cooperation with Mr. Curtis Hansen, Herbarium Collections Manager at AUMNH, represents many decades of work by staff at the George Andrews Laboratory. Significant collections include those of Miller, which formed the basis for several books he authored including, Forest Plants of the Southeast and Their Wildlife Uses (UGA Press), Nonnative Invasive Plants of Southern Forests (USFS GTR SRS-62) and A Field Guide for the Identification of Invasive Plants in Southern Forests (USFS GTR SRS-119). Other important holdings are collections Harold Grelen made in the 1950s and 1960s from the Escambia Experimental Forest in Escambia County, Alabama. Once incorporated into the Freeman Herbarium, these specimens will be available online and in person for researchers from across the world.

Lucardi returns to Mississippi State University for National Darwin Week 2017



Dr. **Rima Lucardi**, Research Ecologist with SRS-4552), returned to her alma mater in Starkville, MS, for the annual celebration of Charles Darwin's (1809-1882) birthday and publication of his seminal work *On the Origin of Species*. She was the graduate student organizer of the 2009 Bicentennial Celebration of the English naturalist and geologist's birthday at Mississippi State University (MSU). The 2017 weeklong program highlighted the significance and importance of diversity in the sciences. She held a tea-time program titled "*Unconscious bias: How race and gender can affect your success in science"*, and a scientific seminar "*Hitchhiking around the world: Invasive plants in the South and how they get here."*

Dr. Rima Lucardi (left) presents to a campus-wide audience at Mississippi State University on during Darwin Week in February 2017

New educational videos highlight invasive species

The Southern Research Station recently teamed with filmmaker Rob Nelson of "Untamed Science" to produce educational videos highlighting various aspects of research in the Station. SRS 4552 and collaborators were recently involved in the development of two of these videos…watch them here!

Invasive Species - Fight 'em or Throw in the Towel?:
https://www.srs.fs.usda.gov/video/invasive-species-untamed-science/

Hope for the Hemlocks: Restoring Balance:
https://www.srs.fs.usda.gov/video/hope-for-hemlocks/

Emeritus scientist Jim Hanula receives the Georgia Entomological Society Founder Award

Scott Horn presents Dr. Jim Hanula with the Georgia Entomological Society Founder's Award

Scott Horn delivered the 2017 Founder's Lecture at the annual Georgia Entomological Society meeting in April. The lecture honored **Jim Hanula** for his long and productive career, as well as his commitment and involvement with the Society. After majoring in Forest Management at Texas A&M, Jim earned his MS and PhD from the University of Georgia, studying European elm bark beetle and the Southern pine coneworm, respectively. He then did a stint in Connecticut working as a turf and ornamental entomologist focusing on black vine weevil and Japanese beetles. With the Forest Service in Athens, GA, Jim was one of the first FS entomologists to examine the functional role of insects in forests. Early work focused on the diet of an endangered woodpecker, how prescribed fire effects insect communities, and the role of dead wood in arthropod diversity and abundance. Jim's recent work focused on invasive insects including hemlock woolly adelgid, redbay ambrosia beetle and kudzu bug. Jim examined the effect of Chinese privet on riparian forest ecosystems and on biological control of this weed. In addition, he conducted several studies on pollinators in forest habitats. His work on pollinators was recognized by the North American Pollinator Protection Campaign and the Forest Service with the 2007 Celebrating Wildflowers Award. Scott Horn also received an award from the GES for his lecture honoring Dr. Hanula. Congratulations Jim and Scott!!

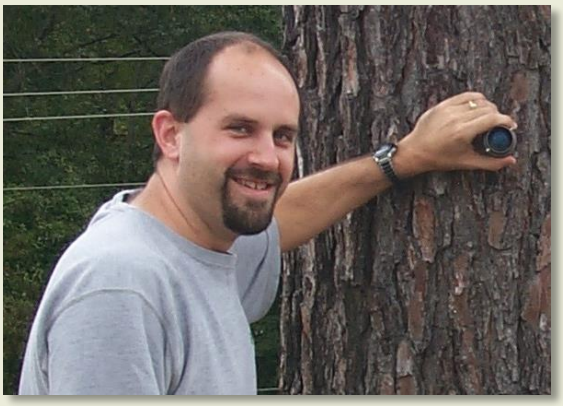
Southern USFS entomologists contribute to Northeastern Southern Pine Beetle Forum

In March 2017, Southern entomologists **Brian Sullivan** (SRS), **Steve Clarke** (FHP) and **John Nowak** (FHP) took their expertise northward to participate in the "Southern Pine Beetle (SPB) in the Northeast Research and Management Forum" at Brookhaven National Laboratory on Long Island, New York. The SPB is an infamous forest pest in the southern U.S., but in recent years has caused widespread pine mortality in the Northeast, where historically it has not been a major problem. Sullivan, Clarke and Nowak joined their northern USFS colleagues in providing management information to over 250 attendees including local politicians, concerned citizens, and northeastern regional natural resource managers.

USFS Participants in the Northeastern SPB Forum included (from L to R) Kevin Dodds, Mike Bohne, John Nowak, Bob Rabaglia, Steve Clarke, Ralph Crawford, Noel Schneeberger, Brian Sullivan, and Ryan Hanavan.

Staff Changes

Dr. Kier Klepzig to become Director of Joseph W. Jones Ecological Research Center



Dr. **Kier Klepzig**, Assistant Director for Research for the Southern Research Station and one-time Project Leader of SRS-4552, has accepted a position **as Director of the Joseph W. Jones Ecological Research Center** at Ichauway, Georgia. The Jones Center is a historic, privately funded forest and research institute on 30,000 acres of beautiful longleaf pine habitat. As director, Kier will be in charge of all operations, including the 85 full time employees who work there. Kier begins his new post at the Jones Center on July 1, 2017. Congratulations, Kier, on this new and exciting phase of your career…you will be missed!

Dr. Forrest Oliveria retires from Forest Health Protection

Forrest Oliveria has retired! He joined FHP as an entomologist in 1979. In 2001, he became the Field Office Representative for the Alexandria Field Office, a position he held until he retired. We thank Forrest for his many years of dedicated service and wish him all the best during this next phase of his life!

Dr. Forrest Oliveria recently retired from his post as the Field Office Representative for the FHP Alexandria Field Office in Pineville, Louisiana.

Technology Transfer

Publications (in print/press):

1. Audley, J., Klingeman, W., **Mayfield, A**., Myers, S., Taylor, A. 2017. **Walnut twig beetle (Coleoptera: Curculionidae: Scolytinae) colonization of black walnut nursery trees**. Journal of Insect Science (in press).

2. Motley, K., N.P. Havill, A.L. Arsenault-Benoit, **A.E. Mayfield**, D.S. Ott, D.W. Ross, M.C. Whitmore, and K.F. Wallin. 2017. **Feeding by *Leucopis argenticollis* and *Leucopis piniperda* (Diptera: Chamaemyiidae) from the western USA on *Adelges tsugae* (Hemiptera: Adelgidae) in the eastern USA**. Bulletin of Entomological Research (in press).

3. Wuest, C. E., T. C. Harrington, **S. W. Fraedrich**, Hye-Young Yun, and Sheng-Shan Lu. 2017. **Genetic variation in native populations of the laurel wilt pathogen, *Raffaelea lauricola*, in Taiwan and Japan and the introduced population in the USA.** Plant Disease 101:619-628.

4. **Zhang, Yanzhuo, J. Hanula, S. Horn, C. Jones**, K. Braman, and J. Sun. 2016. **Fundamental host range of *Leptoypha hospita* (Hemiptera: Tingidae), a potential biological control agent of Chinese privet.** Environmental Entomology. 45(4):897-908.

Submitted Publications (in review):

1. **Miller DR**, **Crowe CM,** Mayo PD, Silk PJ, Reid L, Sweeney JD. 2017. **Interactions between ethanol, hexanediol and hydroxyketone lures on trap catches of hardwood woodborers in southeast USA**. *J. Econ. Entomol.*

2. Gandhi, KJK, Staeben JC, **Miller DR**, Nowak JT**.** 2017. **Multi-trophic interactions mediated by semiochemicals within the southern pine bark beetle guild.** *Agric. For. Entomol.*

3. Noriega, J.A., Hortal, J., Azcárate, F.M., Berg, M.P., Bonada, N., Briones, M.J.I, Del Toro, I., Goulson, D., Ibanez, S., Landis, D.A., Moretti, M., Potts, S.G., Slade, E.M., Stout, J.C., **Ulyshen, M.D.**, Wackers, F.L., Woodcock, B.A., Santos, A.M.C. **Research trends in ecosystem services provided by insects.** Submitted to *Basic and Applied Ecology.*

4. **Ulyshen, M.D.**, Sheehan, T.N. **Trap height considerations for detecting two economically important beetle guilds in southeastern U.S. forests.** Submitted to Journal of Pest Science.

Presentations and Lectures:

1. **Best, S.,** and **S. Fraedrich.** 2017. **The Impact of Laurel Wilt Caused by *Raffealea lauricola* on Clonal Populations of Pondberry.** Southern Appalachian Forest Entomologist/Pathologist Seminar, Crossnore, N.C., March 3, 2017.

2. **Fraedrich, S.W.** 2017. **Laurel Wilt.** Forest Health and Protection, School of Forestry and Natural Resources, University of Georgia, Athens, GA, April, 2017 (invited lecture; Dr. Caterina Villari).

3. **Lucardi, R.D.** 2017. Hitchhiking around the world: Invasive plants in the South and how they get here. Invited seminar; Darwin Week 2017. Mississippi State University. February 2017. Mississippi State, MS [Oral].

4. **Lucardi, R.D.** 2017. **Cogongrass in Georgia and the South: What does it mean for Forest Health?** Invited Lecture-Forest Health and Protection. Warnell School of Forestry and Natural Resources. University of Georgia. February 2017. Athens, GA. [Oral]

5. **Lucardi, R.D.** 2017. Unconscious bias: How race and gender can affect your success in science" [Oral] Program keynote; Darwin Week 2017. Mississippi State University. February 2017. Mississippi State, MS.

6. **Miller DR**, Crowe CM, Sweeney JD. 2017**. Effect of trap height on catches of bark and wood boring beetles in a stand of white oak and shortleaf pine in Georgia.** 27th USDA Interagency Research Forum on Invasive Species, Annapolis MD. (Poster)

7. **Olatinwo, R.** S.-J. S. Sung, and J. Barnett. **Morphological and Genetic Characteristics of Sonderegger Pine.** 19th Biennial Southern Silvicultural Research Conference, Blacksburg, Virginia. March 13-16, 2017.

8. Sweeney J, Hughes C, Van Rooyen K, Silk P, Mayo P, Webster R, Gutowski J, Mokrzycki T, **Miller D**, Ryall K, Qingfan M, Yan L, Francese J. 2017**. Improving surveillance of potentially invasive wood boring beetles: results from recent field trials.** Atlantic Canada Forest Health Workshop, Charlottetown PEI, Canada. (Talk)

9. Sweeney J, Ryall K, Silk P, Mayo P, Hughes C, Van Rooyen K, LeClair G, Gutowski JM, Mokrzycki T, **Miller D**, Qingfan M, Yan L, Francese J. 2017. **Effect of trap height, trap color, and trap lure on efficacy of detecting species of bark- and wood boring beetles (Cerambycidae, Buprestidae, Scolytinae)**. SERG International 2017 Workshop, Fredericton NB, Canada. (Talk)

10. Sweeney J, Silk P, Mayo P, Webster RP, **Miller DR**, Hughes C, Crowe C, Ryall K, Gutowski JM, Mokrzycki T, Francese J, Meng Q, Li Y, Kimoto T. 2017. **Detection of bark- and wood-boring beetles is increased by using a diversity of trap colors and heights and decreased by *Z*-3-hexenol.** 27th USDA Interagency Research Forum on Invasive Species, Annapolis MD. (Poster)

11. Ulyshen, M.D. 2017. **Entomology careers in government laboratories or agencies.** Special lecture in Dr. Kerry Oliver's course on "The Profession of Entomology" at UGA, Spring 2017.

12. **Ulyshen, M.D.** 2017. **Responses of pollinators to vegetation control and prescribed fire in southeastern forests.** Workshop on "Pollinators in managed forests", Oregon State University, March 2017.

13. **Ulyshen, M.D., Horn, S.** 2017. **New wood in the woods: Patterns of wood decomposition in invaded forests.** Interagency forum on invasive species, Annapolis, MD January 2017 [Poster].

14. Wallin, Kimberly F., Tav Aronowitz, Arielle L. Arsenault-Benoit, Stephen Gaimari, Nathan P. Havill, **Albert E. Mayfield**, Kyle Motley, Darrell W. Ross, and Mark C. Whitmore. **Adelges tsugae—where are we now**? 1 Mar 2017, University of Quebec-Montreal. Wallin presenting (invited).

15. Whitney, T.D., **Lucardi, R.D.,** and Gandhi, K.J.K. 2017. **Associations between *Matsucoccus macrocicatrices, Caliciopsis pinea*, and eastern white pine dieback in the Appalachians**. The XXVIII USDA Interagency Forum on Invasive Species. January 2017. Annapolis, Maryland. [Poster]

USDA Forest Service

Forest Health Protection, Southern Region
http://www.fs.usda.gov/main/r8/forest-grasslandhealth

Southern Research Station
RWU 4552: Insects, Diseases and Invasive Plants of Southern Forests
http://www.srs.fs.usda.gov/idip/index.html